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ETHNOZOOLOGY OF FISHING COMMUNITIES FROM ILHA GRANDE (ATLANTIC FOREST COAST, BRAZIL).

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ABSTRACT.— In this study we cover aspects of the ethnozoology of inhabitants of Aventureiro and Provetá, communities located at Ilha Grande, Atlantic Forest coast (SE Brazil). In particular, ethnotaxonomy is approached analyzing the local nomenclature of fish, and comparing it to the scientific taxonomy. Food taboos and medicinal animals are observed among islanders. Food taboos often refer to carnivorous or to medicinal animals (especially fish), besides other morphological aspects of the tabooed animals. We conclude that for folk taxonomy, and fish and game preferences and taboos, both utilitarian and symbolist explanations are useful. We suggest that local knowledge on game and fish usefulness as well as on folk taxonomy may be an important source of information to develop ecologically sound, and socio-economically appropriate resource management plans.

Key words: ethnobiology, ethnozoology, fisheries, Atlantic Forest coast, Brazil

RESUMO.— Neste estudo apresentamos aspectos da etnozoologia dos habitantes de Aventureiro e Provetá, comunidades localizadas na Ilha Grande, região de Mata Atlântica, no litoral sudeste do Brasil. Em particular, abordamos etnotaxonomia através de uma análise da nomenclatura local dos peixes e através de uma comparação entre esta e a nomenclatura científica. Tabus alimentares e animais medicinais são observados nas duas comunidades. Os tabus alimentares geralmente referem-se a animais carnívoros ou medicinais (especialmente peixes) e a aspectos morfológicos de animais rejeitados para consumo. Concluímos que tanto considerações utilitaristas como simbolistas são úteis para explicar as preferências e os tabus alimentares em relação aos peixes e aos animais de caça, assim com para explicar a etnotaxonomia de peixes. Sugerimos que o conhecimento da população local sobre a utilidade de animais de caça e peixes e sobre a etnotaxonomia de peixes, pode ser uma importante fonte de informação para o desenvolvimento de planos de manejo ecológico, sócio, e economicamente apropriados.

RÉSUMÉ.— Dans cette étude nous couvrons des aspects de l'ethnozoologie des habitants d'Aventureiro et de Provetá, deux communautés situées à l'île d'Ilha

Grande, au sud-est du Brésil et appartenant à la forêt de la Mata Atlântica. En particulier, l'ethnotaxonomie est approché en analysant la nomenclature locale des poissons, et en la comparant à la taxonomie scientifique. On analyse aussi les tabous alimentaires et l'usage des animaux médicinaux parmi des îliens. Les tabous alimentaires se rapportent souvent aux animaux carnivores ou aux animaux médicinaux (en spécial les poissons), sans compter d'autres aspects morphologiques des animaux. Nos conclusions démontrent que les considérations utilitaristes et symbolistes sont importantes pour expliquer les préférences et les tabous alimentaires par rapport à l'utilisation des poissons et des animaux chassés. Nous proposons que la connaissance locale sur l'utilité de chasse et de poissons aussi bien que sur la ethnotaxonomie des poissons est une source importante d'information pour développer des projets de gestion de ressource qui seront écologiquement, socialement et économiquement appropriées.

INTRODUCTION

The study of native or local knowledge systems can contribute to the creation of alternative strategies for ecological management (Posey et al. 1984), especially in geographic areas where scientific data are usually scarce or nonexistent (Johannes 1998, Ruddle 1994). Local knowledge can be a source of information on current status of resources, local ecosystem dynamics, species diversity, species behavior, interactions among components of ecosystems, and local environment characteristics among other things. Traditional natural resource management practices based on local knowledge can also be a source of information on ecologically sustainable management practices. This is not to say, however, that all traditional management practices are ecologically sound. As Johannes (1978:355) pointed out, "Environmentally destructive practices coexisted, in most societies, with efforts to conserve natural resources. But the existence of the former does not diminish the significance of the latter." Sustainable natural resource management based on local knowledge by native or local populations has been recorded in several places worldwide (Berkes 1985; Berkes et al. 1989; Feeny et al. 1990; Berkes and Kislaliogluo 1991; Gadgil et al. 1993).

Several terms have been used to describe the knowledge of local ecological systems, accumulated through a long series of observations and transmitted from generation to generation (Gadgil et al. 1993; Berkes 1999), including native knowledge, indigenous knowledge, traditional (ecological) knowledge, and local knowledge. To avoid semantic and conceptual problems, we will use here the term *local knowledge* because it is the least problematic one (Ruddle 1994).

One way of studying local knowledge about living organisms is to observe how the organisms are classified and what their uses are. Ethnobiological studies on the classification of living organisms, as well as on food taboos and preferences, constantly show the debate between utilitarian/materialist and structuralist/symbolist (Berlin 1992; Hunn 1982; Hay 1982; Harris 1987a, 1987b; Vayda 1987a, 1987b). In the light of this debate, the purpose of this study is then to investigate (a) fish ethnotaxonomy and its relation to scientific taxonomy, (b) food preferences and taboos, and (c) animals used in local medicine, in two fishing communities of Ilha Grande (R.J, Southern coast of Brazil). Understanding the

reasons behind food preferences and taboos, the use of animals in local medicine, and the diversity of fishing resources and its classification may help to elaborate more appropriate and ecologically sound management plans for these communities.

STUDY SITES

Ilha Grande means big island in Portuguese. It is almost 190 km^2 and is located off the southeastern Brazilian coast (23∞ 10' S, 44∞ 17' W, Gr.), in front of Angra dos Reis Bay (Angra dos Reis, Rio de Janeiro State) (Figure 1). Today the island is mainly covered by secondary tropical rainforest after being used until some decades ago for agriculture (particularly coffee and sugar-cane plantations), pastures, and tree logging. The size of the local population, known as *caiçaras*, has been quite stable around seven to eight thousand people during the last two centuries (Oliveira et al. 1994). *Caiçaras* are tillers and fishers, descendants of Indians and European settlers, mainly Portuguese (Marcilio 1986). Their subsistence is based mainly on manioc cultivation and fishing activities. However, since 1950's, a shift has occurred from agriculture to fishing due to low prices of agricultural products relative to fish (Diegues 1983; Begossi et al. 1993).

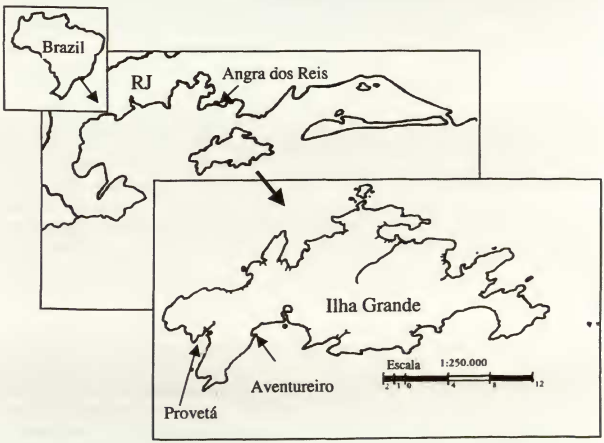

FIGURE 1.— Map of the study site, showing Grande Island Bay and Grande Island, where Aventureiro and Provetá are located. The Bay of Ilha Grande is located in the southern coast of Rio de Janeiro State, in Brazil.

We studied two fishing communities in Ilha Grande: Provetá and Aventureiro, both situated at the southwestern side of the island. Provetá is the second biggest community of the island including around 260 houses. Its economy is based mainly on the sardine fishery. There is a clear social stratification among its population, where few boat owners employ most of the fishermen in the community. Electric power is offered only to buildings from the center of the village, including the "Assembléia de Deus" (Assembly of God) church (Pentecostal), the elementary and junior high school, the medical office, five small markets, and the most wealthy houses.

Aventureiro is one of the smallest communities of the island (22 families), the most isolated, and the only one facing open sea. Although young men from Aventureiro work for the Provetá sardine fishery, small-scale artisanal fisheries and shifting cultivation are the main subsistence activities of the *caiçaras* of Aventureiro. Inhabitants of Aventureiro depend on Provetá or on Angra do Reis (inland city) to sell their products, to buy goods, and to provide medical assistance. There is an elementary school in Aventureiro, and adult illiteracy level is almost the same as at Provetá (around 20%). There is no municipal electric power or water in Aventureiro. Because Aventureiro is located inside a State protected area (Reserva Biológica Estadual da Praia do Sul - RBEPS), nobody is allowed to move in, except relatives of the inhabitants.

The RBEPS was institutionalized as a top-down management by the Rio de Janeiro State government, as well as the Marine Park of Aventureiro (5 nautical square miles) situated in the ocean adjacent to the community of Aventureiro. The Aventureiro people should live according to State regulations for protect areas, which include prohibition of game hunting and fishing. However, this is not often the case, as the RBEPS staff is insufficient to monitor the entire area and enforce regulations.

METHODOLOGY

The field work on Ilha Grande was carried out from April 95 to September 1996. Surveys about aquatic and terrestrial animals uses were performed to identify the following issues: (a) which fish were the most common, consumed, preferred, avoided, sold, or had medical importance; (b) which game were consumed or avoided; (c) which were the reasons for which fish and game were avoided; and (d) which animals were used for medicinal purposes. Items *a*, *b* and *d* investigated the use of local animal resources by this *caiçara* population. Item *a* also provided information on fish diversity and folk classification of fishing resources. Item *c* focused on understanding the reasons behind food preferences and taboos.

We visited all houses in Aventureiro and interviewed husband and/or wife, for a total of 30 adult *caiçaras*. Because Provetá is a large community, we visited only 25% of its houses and interviewed 100 *caiçaras*. The sampling methodology consisted of visiting one house, skipping the next three, and visiting the fourth house, repeating this procedure until the whole community was covered.

ETHNOTAXONOMY OF FISH

According to Berlin (1973, 1992) folk genera are groups of animals or plants easily recognized on the basis of a large number of gross morphological characteristics, usually described by primary names (monomials). Folk species require a more detailed observation on the basis of very few morphological characters to be distinguished and are linguistically binomials (generic name is modified by an adjective which usually describes some obvious morphological character) (Berlin 1973, 1992).

During field work, 35 fish specimens were collected and identified by *caiçara* folk names, and afterwards by their scientific names[1] according to Figueiredo (1977), Figueiredo and Menezes (1978, 1980), Menezes and Figueiredo (1980, 1985) (Appendix 1). During interviews in both communities studied at Ilha Grande (Provetá and Aventureiro), 123 fish names quoted were registered; their corresponding scientific names were obtained from the above literature plus Godoy (1987) and Begossi and Figueiredo (1995) (Appendix I). From 123 fishes quoted during interviews, 97 fishes had monomial names (folk genera) and 25 had binomials (folk species). In addition, one fish, which had a monomial name (***Languicha***), was considered a folk species for being a contraction of a binomial (***Corcoroca-languicha***). Correspondent scientific names were not found in literature for 4 folk genera and 5 folk species.

In the present study, the analysis of folk and scientific systems of classification had the scientific species and the folk genus as the basic taxa, as proposed by Berlin (1973). We present below four types of correspondence verified by Berlin, and one more type which we call "Over-differentiation Type II."

a) <u>One-to-one correspondence:</u> A single folk genus corresponds to only one scientific species. Example: ***Barana*** (*Elops saurus*) (ladyfish).

b) <u>Over-differentiation type I:</u> Two or more folk generic taxa refer to a single scientific species. Example: *Caranx crysos* is known as ***Manequinho***, ***Carapau*** and ***Xerelete*** (bluerunner). However, in this case, and according to local fishermen, those names are given to different sizes of the same fish (growing phases). Another example is *Trachinotus goodei* known as ***Garabebê*** or ***Pampo-branco***. In this latter case, however, folk names are not associated with growing phases.

<u>Over-differentiation type II</u>: Two or more folk genera are used to designated two or more, although the same, scientific species. Example: ***Camburu*** and ***Moréia*** (moray) are folk names by which are recognized several species from the genus *Gymnothorax*s.

c) <u>Under-differentiation</u>: Refers to polytypy and can be divided into two types:
<u>Type I:</u> A single folk genus refers to two or more scientific species from the same genus. Example: ***Caranha*** (more than one species from the *Lutjanus* genus) (snapper).
<u>Type II:</u> A single folk generic taxon refers to two or more species of two or more scientific genera. Example: ***Corcoroca*** (species from more than one genus from Haemulidae family) (tomtate). There are also some rare cases where a folk genus refers to scientific species from more than one family. Ex: ***Cação*** (species from 13 families) (shark) and ***Arraia*** (species from 10 families) (rays).

The correspondence between the 97 folk genera and the scientific species is presented in Table 1. Carangidae seems to be the most known fish family among *caiçaras* from Ilha Grande. There is a high correspondence among folk genera and scientific species from the Carangidae. Moreover, from 20 folk species we identified, 6 were Carangidae, 4 Haemulidae and 4 Clupeidae, which also suggest the well known importance of Carangidae. These results may indicate species from this family can be easily recognized on the basis of external morphological characters; or, perhaps, local people may have some incentives to recognize Carangidae fishes. Indeed, the Carangidae represent 24% of all fish quoted by more than 10% of interviewees as being of local significance or usefulness (Tables 5 and 6), following in second place by the Scombridae, Haemulidae, Sciaenidae, Serranidae, Sparidae and Mugilidae, which represented only 7%.

Although some folk names of Sciaenidae correspond to only one scientific name, polytypy was common in this family. Polytypy was also often observed for Serranidae and Exocoetidae-Hemiramphidae, which suggests *caiçaras* have more trouble or less incentives to differentiate fish from these families. For instance, no Sciaenidae, Serranidae or Exocoetidae-Hemiramohidae fish were quoted by more than 10% of the interviewees as fish that should be avoided (i.e., ***carregado*** – see below), and only one Sciaenidae (***Corvina***), among all these families, was rejected by interviewees from Ilha Grande (Table 6). It is worth noting, however, that ***Cor-***

TABLE 1.— Correspondence between folk genera and scientific species of the 97 monomial fish names (folk genera) quoted during interviews.

Type of correspondence	Numbers of folk genera involved	Numbers of cases found in each scientific family
One-to-one correspondence	31 folk genera	5 cases from Carangidae 4 cases from Sciaenidae 3 cases from Scombridae 19 cases from 16 different scientific families
Over-differentiation type I (Synonyms)	7 cases including 11 folk genera and 4 folk species	4 cases from Carangidae
Over-differentiation type II (Synonyms)	4 cases including 12 folk genera	
Under-differentiation type I (Polytypy)	13 folk genera	3 cases from Serranidae 10 cases from 9 different scientific families
Under-differentiation type II (Polytypy)	26 folk genera	4 cases from Sciaenidae 3 cases from Exocoetidae-Hemiramphidae 16 cases from 15 different scientific families Plus: ***Arraia*** (ray) from 10 different families ***Cação*** (shark) from 13 different families ***Linguado*** (flounder) (Pleuronectiform)

vina (Croaker) is a well differentiated fish, showing a one-to-one correspondence between folk genus and scientific species (*Micropogonias furnieri*).

So, what are the incentives for local people to classify or differentiate fish? Berlin (1992) proposes and discusses the principles of general classification of plants and animals by traditional societies as reflecting an intellectual or cognitive process of comprehending the world (a process motivated by "interest," first of all). On the other hand, Hunn (1982) argues that ethnoscientists interested in folk biological classification have paid insufficient attention to the practical significance of such systems.

The fact that Carangidae species are well differentiated and also the most represented among those of useful meaning for local people, supports Hunn's arguments. On the other hand, some useful fish are quite under-differentiated referring to species of two or more scientific genera (under-differentiation type II), including species of Clupeidae, Haemulidae, Labridae, Scaridae, Scombridae and Elasmobranchii fish (Tables 5 and 6). To contribute to this debate and to the understanding of folk taxonomy, Clement (1995) suggests that "it is only through minute analysis of uses of plant and animal products alongside study of the classification of the same plants and animals in a taxonomic system which is 'apparently' morphological or behavioral that one can discover the relation between cognitive and utilitarian factors."

Although such "minute analysis" was not performed in this research, there are clear evidences of cognitive factors in the folk taxonomy of *caiçaras* from Ilha Grande. Some folk species from the same folk and scientific genus are differentiated by their colors; examples are ***Pampo-branco*** (white) (*Trachinotus goodei*) and ***Pampo-amarelo*** (yellow) (*Trachinotus carolinus*); and ***Xaréu-branco*** (white) (*Caranx hippos*) and ***Xaréu-preto*** (black) (*Caranx lugubris*). Others are differentiated by their morphological or behavioral characteristics; for instance, ***Galo-testudo*** ("big forehead") (*Selene vomer*) and ***Galo-da-correição*** ("one that moves in schools") (*Selene setapinnis*). Interesting to note here is that ***Galo*** is not quoted among the fishes most useful or avoided; that is, cognitive factors seems to be more evident than the utilitarian principle in this case.

Although all the above examples are from the Carangidae, color, morphological and behavioral characteristics are indeed commonly used adjectives that modify generic names (folk genera) in *caiçara* taxonomy. Examples from the Hemulidae, Labridae, Sciaenidae, Clupeide, include respectively ***Corcoroca-bicuda*** ("long beak") (*Haemulon plumieri*), ***Gudião-prego-de-cobre*** ("old copper color") (*Halichoeres radiatus*); ***pescada-branca*** (white) (*Cynoscion leiarchus*); and ***sardinha-cascuda*** ("hard scales") (*Harengula clupeola*).

Our results suggest that both cognitive and utilitarian factors are important components of the biological classification of fish among *caiçaras*. These findings are in accordance to those presented by Begossi and Figueiredo (1995) for fishing communities in the same coastal region. These authors observed a close relationship between binomial folk names and important economic fish families (e.g., Carangidae, Serranidae and Sciaenidae) except for Labridae and Scaridae (folk name ***Gudião*** or ***Budião***). They suggest that "perhaps, the conspicuousness and beautiful colors of these [***Gudião***] species making them highly noticeable and iden-

tifiable, explains their importance in folk nomenclature" (Begossi & Figueiredo 1995: 716). That is, cognitive processes also play a role in folk taxonomy.

COMPARING ETHNOTAXONOMY OF FISHES FROM THREE ISLANDS OF SOUTHEASTERN BRAZILIAN COAST

Based on Berlin's definition for folk genera and species we re-analyzed data from Begossi and Figueiredo (1995) for Buzios island and Sepetiba bay, both *caiçaras* communities also located at the southeastern Brazilian coast. We compared those data to the ones obtained for Ilha Grande (Tables 2 and 3). In all three localities we observed synonyms among folk genera (over-differentiation) varying from 19% to 29% of all folk genera. The percentage of folk genera corresponding to only one scientific species was very low at Ilha Grande (about 1/3) if compared to data from Buzios island and Sepetiba bay (over 2/3). Moreover, 40% of folk genera from Ilha Grande were polytypic whereas polytypy appears only in less than 10% of the folk genera from the other two places (Table 2).

TABLE 2.— Correspondence between folk genera and scientific species of fishes from Ilha Grande (Provetá and Aventureiro), Búzios island and Sepetiba bay.

Correspondence Types	Percentage of Folk Genera		
	Ilha Grande	Búzios Island[1]	Sepetiba Bay[1]
One-to-one correspondence	32	79	68
Over-differentiation type I	11 (7 cases)	16 (8 cases)	26 (7 cases)
Over-differentiation type II	12 (4 cases)	3 (1 case)	3 (1 case)
Under-differentiation type I	13	1	2
Under-differentiation type II	27	1	6
Folk genera not identified	4	0	0
Total of folk genera	97	80	62

[1]Data from Begossi and Figueiredo (1995)

The proportion of folk species in relation to all fish folk names were low (less than 1/3) for all localities: 20% at Ilha Grande, 31% at Búzios island and 16% at Sepetiba bay. The correspondence one-to-one between folk species (binomials) and scientific species (binomials) occurs in 40% of folk species from Ilha Grande, 47% from Búzios island, and 50% from Sepetiba bay. In all localities we found cases of synonyms and cases of polytypy among folk species (i.e., one folk species corresponding to two or more scientific species) (Table 3).

Geoghegan (1976) verified that folk systems of biological nomenclature reflect accurately natural biological diversity, despite of the strong influence of cultural factors. When analyzing folk and scientific taxa as proposed by Berlin, we verified at Ilha Grande that the folk genera directly recognized (correspondence one-to-one), under-differentiated and over-differentiated are distributed in proportions to around one third. This could suggest that classification of fish by *caiçara* from

TABLE 3.— Correspondence between folk species and scientific species of binomial fish names from Ilha Grande (Provetá and Aventureiro), Búzios island and Sepetiba bay.

Correspondence Types	Percentage of Folk Species		
	Ilha Grande	Búzios Island[1]	Sepetiba Bay[1]
One-to-one	40	47	50
Over-differentiation (synonyms)	16 (2 cases)	28 (5 cases)	42 (2 case)
Under-differentiation (polytypy)	16	17	8
Total of folk species[2]	25	36	12

[1]Data from Begossi and Figueiredo (1995)

[2]At Ilha Grande, 20% of the folk species were not identified and 16% were synonymous with folk genera (over-differentiation type I). At Búzios Island, 8% of the folk species were synonymous with folk genera.

Ilha Grande are far from reflecting natural biodiversity. However, when we sum the folk species (10) and folk genera (31) related to only one scientific species and the folk species and folk genera classified as over-differentiated type I (synonyms) (19) we verified that 49% of all fishes cited during interviews at Ilha Grande were easily recognized. Moreover, this percentage is much higher for Búzios Island and Sepetiba Bay, respectively, 91% and 93%. These results suggest that indeed *caiçaras* have an accurate knowledge about fish diversity as proposed by Geoghegan (1976). The lower correspondence of one-to-one type between folk and scientific taxonomy, in relation to folk genera or folk species from Ilha Grande when compared to the other two localities may be the result of the methods used. All fishes from Búzios island and Sepetiba bay were collected during field work, identified by their folk names and afterwards by scientific taxonomy, whereas only 26% of the fishes cited during interviews at Ilha Grande were collected and scientifically identified. The rest of the fish names identification was done through corresponding folk to scientific names obtained from literature about localities from south and southeastern Brazilian coast, including Búzios island and Sepetiba bay. The fact that only 26% of all fishes in Ilha Grande were collected and scientifically identified may also explain the higher percentage of folk genera under-differentiation in Ilha Grande compared to the other two localities.

FISH AND GAME CONSUMPTION, AND FOOD TABOOS[2]

Because of the existence of synonyms and polytypy among fish folk names, when analyzing the usefulness of fishes and the food taboos in Ilha Grande, we grouped some folk genera and folk species of fishes as presented in Table 4. We analyzed animal preference, consumption, uses and prohibition in case of illness at Aventureiro and Provetá (Tables 5 and 6). The most considered common fishes in both communities were also cited as the most consumed ones: spottail pinfish (***marimbá***) (*Diplodus argenteus*), bluefish (***enchova***) (*Pomatomus saltatrix*), yellow chub (***pirajica***) (*Kyphosus sp.*) and bluerunner (***xerelete***) (*Caranx crysos*) at

Aventureiro; and bluerunner, grouper (*garoupa*) (*Epinephelus* sp.) and bluefish at Provetá. These results suggest that consumption is related to those fishes that are more available. Availability here refers to what is caught during fisheries and not to all fishing resources. Another explanation is that interviewees simply associated their answers about the most common fish in their localities to what is the most common in their everyday dishes. If this is the case, this association can create a bias in the use of local knowledge about fish stocks in management design; so, further investigation is needed.

TABLE 4.— Fish folk names from Ilha Grande chosen to represent their synonyms or folk species included within folk genera.

Fish folk names	Synonyms or folk species included in folk genera
Bonito (Bullet mackerel or little tunny)	***Bonito-Cadelão***
Cação (Shark)	any folk species of ***Cação*** cited
Corcoroca (Tomtate)	any folk species of ***Corcoroca*** cited
Camburu (Moray)	***Moréia***
Galo (Atlantic moonfish)	both species of ***Galo***
Garabebê	Pampo-Branco
Gudião (Hogfish, Parrotfish, Wrasse)	excepting ***Gudião-Sabonete*** (it was collected and identified as being from another family) all folk species of ***Gudião*** cited
Imbetara (Southern kingfish)	***Papa-terra*** and ***Perna-de-Moça***
Olho-de-Cão (Bigeye)	***Jaguareçá, Jingolê, Padecedo*** and ***Sambalo***.
Pampo (Florida pompano)	***Pampo-Amarelo***
Parati-Barbudo (Mullet)	***Barbudo***
Peixe-Porco (File fish)	***Capucho***
Pescada (Weakfish)	***Pescada-branca***
Sabonete	***Gudião-Sabonete***
Sardinha (Sardine)	any folk species of ***Sardinha*** cited
Xaréu-Branco (Jack crevalle)	***Xaréu***
Xerelete (Bluerunner)	***Carapau*** or ***Manequinho***

Sardine (***sardinha***) (Clupeidae) is considered a very common fish in Provetá. However, it was not cited among the most consumed fishes in that community. The fact that the sardine fishery is the main source of income in Provetá explains why this fish was cited as the most common and the most sold fish by *caiçaras* from Provetá. Bluerunner and bluefish are also frequently sold by fishermen from both communities.

At *caiçara* communities, food taboos can be observed through animal rejection or avoidance or because animals are considered *carregados*. The term *carregado* (also known as *reimoso*) refers to some types of meat which are "strong" or cause indigestion and should be avoided by ill people.

Bluerunner, grouper and mackerel (***cavala***) (*Scomberomorus cavalla*) are among the most preferred fishes and whitemouth croaker (***corvina***) (*Micropogonias furnieri*) among the most rejected fish in both communities we studied. Pufferfish (***baiacu***) (*Sphoeroides* sp.) and cutlass fish (***espada***) (*Trichiurus lepturus*) at Provetá and moray (***camburu***) (*Gymnothorax* sp.) and mullet (***parati***) (*Mugil* sp.) at Aventureiro,

were also rejected. According to interviewees, croaker is avoided because of its stink and bad taste. However, it is very recommended for illness at Provetá (Table 6). This result agrees to the "drugstore hypothesis" (Begossi 1992) which suggests that fish used in case of illness by relatively isolated people may be considered taboo in order to be available for folk medicine. Accordingly, croaker avoidance in Ilha Grande seems to have a conservation purpose since croaker is one of the most consumed and commercialized fishes along the Brazilian southeastern coast (Menezes and Figuereido 1980). In fact, Colding (1997), who studied several taboos found in indigenous societies, verified that 60% of those taboos had some effect on conservation.

According to *caiçaras*, pufferfish is rejected because it is venomous. Indeed, pufferfish poisoning has been reported since the seventeenth century (Piso 1658). Cutlass fish is avoided because it is a scaleless fish (*peixe de couro*), and some times it possesses worms in its flesh. Scaleless fishes are also avoided in Amazon area (Pereira 1974). Moray is rejected because of its snake-shape. Besides its appearance, Begossi (1992) observed that the aggressive behavior, bad smell and conspicuous teeth of moray also contribute to is avoidance at Búzios island.

Mullet (***parati***) is avoided because it is a *carregado* fish. Actually, mullet, bullet mackerel or little tunny (***bonito***) (Scombridae) and jack (***xaréu-preto***) (*Caranx lugubris*) were considered *carregado* fish. An association between *carregado* and carnivorous species (*peixes de dentes*) is suggested by interviewees. This association was proposed by Begossi (1992) and Begossi and Braga (1992). According to these authors, the fish position at the food chain can influence its preference as food item. Fishes at a high trophic level have a higher probability of acquiring toxins and being considered venomous fishes (*carregados*). Indeed, 63% of *carregado* fishes in both communities are piscivorous (Table 7), which reinforces their hypothesis.

Fishes recommended in case of diseases or after childbirth are known as *mansos*. The fishes most cited as *mansos* during interviews were bluerunner and southern kingfish (***imbetara***) (*Menticirrhus* sp.) at Aventureiro, and tomtate (***corcoroca***) (Haemulidae), croaker and grouper (***mira***) (*Mycteroperca* sp.) at Provetá. Begossi (1992), Begossi and Braga (1992) and Hanazaki et al. (1996) verified that *manso* fish are usually plankton eaters or feed on small invertebrates or are detritivorous. This relationship among *mansos* fishes and predators of the beginning or the middle of the food chain is also verified here: 71% of those fishes cited as mansos in Aventureiro or in Provetá are detritivorous or feed on small invertebrates or small fishes (Table 7).

Our results demonstrate that *caiçara* taboos on fish consumption may be related to both utilitarian and cognitive factors. Avoidance of a fish due to its toxicity or indigestibility (e.g., pufferfish and *carregado* fishes) and due to conservation purposes ("drugstore hypothesis") has strong useful meaning (utilitarian perspective), as well as knowledge on *manso* fishes. On the other hand, avoidance of fish due to its appearance and behavior (e.g., moray) is clearly based on cognitive factors (symbolist perspective).

As it occurs among fish resources, some game animals are more preferred or more avoided than others. At both communities, we observed that paca (***paca***) (*Agouti paca*), agouti (***cutia***) (*Dasyprocta azarae*), lizard (***lagarto***) (*Tupinambis merianne*), opossum (***gambá***) (*Didelphis marsupialis*) and nine-banded armadillo

TABLE 5.— Fishes cited as common, consumed, preferred and sold, according to at least 10 % of interviewees from Aventureiro (**Av**) and Provetá (**Pr**), Ilha Grande: Percentage of citations of each species related to (*per*) the number of interviewees.

FISHES		Percentages of Citations							
Folk and	Scientific	Common		Consumed		Preferred		Sold	
English Names	Names	Av	Pr	Av	Pr	Av	Pr	Av	Pr
Bonito Bullet mackerel or little tunny	Several species from Scombridae	20							
Cavala Mackerel	*Scomberomorus cavalla*	20				43	32	13	11
Cação Shark	Several species							13	
Corvina Whitemouth croaker	*Micropogonias furnieri*	10		14					
Enchova Bluefish	*Pomatomus saltatrix*	53	13	41	22	53		75	37
Garabebe	*Trachinotus goodei*							13	
Garoupa Grouper	*Epinephelus* sp.	33	22	18	21	33	43	13	22
Marimbá Spottail pinfish	*Diplodus argenteus*	57	11	50				13	
Olho de Boi Great amberjack	*Seriola dumerili*						13		
Olho de Cão Bigeye	*Priacanthus* sp.		10						
Olhudo Horse-eye jack	*Caranx latus*	17		18				62	
Pampo Florida pompano	*Trachinotus carolinus*	13				10			
Pirajica Yellow chub	*Kyphosus* sp.	40	13	41	16	27	13	13	
Sardinha Sardine	Several species from Clupeidae	10	59		11			13	52
Sargo Black margate	*Anisotremus surinamensis*			32					
Taínha Mullet	*Mugil platanus*		13		17				
Tiniúna Sargeant	*Abudefduf saxatilis*					23			
Xaréu-Branco Jack crevalle	*Caranx hippos*							25	
Xaréu-Preto Jack	*Caranx lugubris*	13						13	
Xerelete Bluerunner	*Caranx crysos*	50	69	50	66	53	29	75	33
Total of folk names		26	31	17	22	18	19	12	17
Interviewees		30	97	22	81	30	99	8	27

TABLE 6.— Fishes cited as rejected, avoided, and recommended for consumption during illness, according to at least 10 % of interviewees from Aventureiro (**Av**) and Provetá (**Pr**), Ilha Grande: Percentage of citations of each species related to (*per*) the number of interviewees.

FISHES		Percentages of Citations					
Folk and English Names	Scientific Names	Rejected		Avoided (*carregados*)		Recommended (*mansos*)	
		Av	**Pr**	**Av**	**Pr**	**Av**	**Pr**
Baiacu Pufferfish	*Sphoeroides* sp.		15				
Bonito Bullet mackerel or Little tunny	Several species from Scombridae	10	11	67	65		
Camburu Moray	*Gymnothorax* sp.	19					
Cavala Mackerel	*Scomberomorus cavalla*					14	
Corcoroca Tomtate	Several species from Haemulidae					18	42
Corvina Whitemouth croaker	*Micropogonias furnieri*	19	12			21	42
Enchova Bluefish	*Pomatomus saltatrix*			19	14	14	
Espada Cutlass fish	*Trichiurus lepturus*		13	19	14		
Frade Angelfish	*Pomacanthus paru*	14					
Garabebe	*Trachinotus goodei*					11	
Garoupa Grouper	*Epinephelus* sp.					25	15
Gudião Hogfish, Wrasse, Parrotfish	Species from Labridae e Scaridae	10					
Imbetara Southern kingfish	*Menticirrhus* sp.					39	23
Marimbá Spottail pinfish	*Diplodus argenteus*			15		18	
Mira Grouper	*Mycteroperca acutirostris*						36
Olho de Boi Great amberjack	*Seriola dumerili*	10		22			
Olho de Cão Bigeye	*Priacanthus* sp.					18	12
Pampo Florida pompano	*Trachinotus carolinus*					32	
Pirajica Yellow chub	*Kyphosus* sp.	10				32	20
Parati Mullet	*Mugil* sp.	29	10	78	38		

TABLE 6 (continued).

FISHES Folk and English Names	Scientific Names	Percentages of Citations Rejected Av	Pr	Avoided (*carregados*) Av	Pr	Recommended (*mansos*) Av	Pr
Sardinha Sardine	Several species of Clupeidae	10		33	17		
Taínha Mullet	*Mugil platanus*					21	
Xaréu-Preto Jack	*Caranx lugubris*			26	46		
Xerelete Bluerunner	*Caranx crysos*					43	13
Total of folk names		14	40	12	25	24	27
Interviewees		21	78	27	96	28	90

TABLE 7.— Feeding habits of fish avoided and recommended during illness according to at least 10% of interviewees from both Aventureiro and Provetá (A + P), only from Aventureiro (A) and only from Provetá (P).

Folk Names[1]	English Names	Communities	Feeding Habits[2]
Avoided (*carregado*)			
Bonito	Bullet mackerel or l Little tunny	A + P	fishes and squid
Enchova	Bluefish	A + P	fishes
Espada	Cutlass fish	A + P	fishes
Marimbá	Spottail pinfish	A	crustacea, molluscs and algae
Olho de Boi	Amberjack	A	fishes and invertebrates
Parati	Mullet	A + P	vegetal detritus
Sardinha	Sardine	A + P	plankton
Xaréu-Preto	Jack	A + P	fishes and invertebrates
Allowed (*manso*)			
Cavala	Mackerel	A	fishes and squid
Corcoroca	Tomtate	A + P	invertebrates
Corvina	Croaker	A + P	small fishes, annelids and benthonic crustacea
Enchova	Bluefish	A	fishes
Garabebe		A	small invertebrates
Garoupa	Grouper	A + P	fishes and crustacea
Imbetara	Southern Kingfish	A + P	worms and benthonic crustacea
Marimbá	Spottail pinfish	A	crustacea, molluscs and algae
Mira	Grouper	P	fishes and crustacea
Olho de Cão	Bigeye	A + P	small fishes, crustacea, molluscs
Pampo	Florida pompano	A	small fishes, molluscs, crustacea and polycheats
Pirajica	Yellow chub	A + P	vegetal matter and small invertebrates
Tainha	Mullet	A	vegetal detritus
Xerelete	Bluerunner	A + P	small fishes and invertebrates

[1]Scientific names are found on Table 4.

[2] From Figueiredo and Menezes (1978, 1980), Menezes and Figueiredo (1980, 1985) and Moyle and Cech (1982)

TABLE 8.— The most preferred and rejected game animals by interviewees from Aventureiro and Provetá: Names and percent of citations in relation to total number of interviewees.

ANIMALS Folk and English Names	Scientific Names[1]	Percentages of Citations Preferred		Rejected	
		Aventureiro	Provetá	Aventureiro	Provetá
Cutia Agouti	*Dayprocta azarae* Rodentia	68	57	12	2
Gambá Opossum	*Didelphis marsupialis* Marsupialia	59	28	29	20
Lagarto Lizard	*Tupinambis merianae* Saura	62	22	21	40
Macaco or ***Mico*** Howler monkey or Capuchin monkey	*Alouatta fuscus* or Cebus apella Primates	6		27	8
Ouriço Porcupine	*Coendou sp.* Rodentia	6	10	62	32
Paca Paca	*Agouti paca* Rodentia	91	72	3	2
Preá Cavy	*Cavia aperea* Rodentia	38	11	24	7
Rato-de-espinho Spine rat	Echimyidae Rodentia	12		3	
Tatu Nine-banded armadillo	*Dasypus novemcinctus* Xenarthra	56	31	24	19
None		9	12	21	18
All					7
Total of folk names		13	14	14	19
Interviewees		34	97	34	97

[1] Scientific names of mammals were obtained from Nowak (1991) and Emmons and Feer (1990)

(***tatu***) (*Dasypus novemcinctus*) are the most preferred game (Table 8). Nevertheless, opossum also appears among the three most rejected games in both communities, and lizard is the most avoided at Provetá. Porcupine (***ouriço***) (*Coedon* sp.) is also very avoided in both communities, and monkey (***macaco*** or ***mico***) (*Alouatta fusca* or *Cebus apella*) is the third most rejected game at Aventureiro.

Folk explanations for these taboos are based especially in appearance and in physiologic characters (digestibility): lizard is *carregado* and has snake and/or alligator shape. Monkey, when has its skin and tail taken off it, looks like a child. Porcupine (***ouriço***) is *carregado*, stinks, and during certain season of the year its thorns fall down and wounds appears on its body. Opossum is *carregado* and has a bad smell.

We also found scientific explanations to these taboos. The "drugstore hypothesis" (Begossi 1992) cited above is enough to explain why lizard and opossum are avoided: both animals are placed among the most cited ones as medicinal animals (Table 9). This explanation is based on the cost-benefit relationship (utilitarian/

materialist view). On the other hand, Sahlins (1976), who considered symbolic criteria for analyzing human behavior, has proposed that not-consumed animals are close to humanity, and consumed animals are different from human life. This symbolist view seems to be very appropriate and in close accord with the folk explanation for monkey avoidance. As in the case of fish, taboos on game consumption in Ilha Grande seem to related to both utilitarian and cognitive factors.

MEDICINAL ANIMALS

Zootherapy is an important aspect of ethnozoology and deals with animals used as medicine (Freire and Marques 1996). Recently, medicinal animals used by local populations have been recorded in Brazil (Begossi 1992, 1998; Begossi and Braga 1992; Marques 1995; Freire and Marques 1996; Souto 1996; Silva and Marques 1996). *Caiçara* knowledge about the use of medicinal animals from both Aventureiro and Provetá is listed in Table 9. Lizard (***lagarto***) and chicken (***galinha***) (*Gallus domesticus*) are the most used animals for medicinal purposes. The importance of lizard fat as medicine-therapy has been recorded in several Brazilian regions such as Paraíba (Souto 1996), Várzea do Marituba - Alagoas (Marques 1995), and Búzios island - São Paulo coast (Begossi 1992). At these last two places, chicken fat used for medicinal purpose was also recorded. In fact, fat (*banha*) is the body part cited as the most used from most of the animals cited at Ilha Grande; it is usually utilized for curing respiratory diseases, skin thorns, wounds and rheumatism at both studied communities (Table 9).

Bronchitis is usually cured through *simpatia* (beliefs). *Simpatia*, in *caiçara* terms, means that an ill person eats or drinks a processed part of an animal without knowing what she/he is taking. The part of animal (skin, heart, stings, etc) is toasted, ground and mixed in the meal or drinking water. The fact that *simpatia* raw material is characteristically burned (what eliminates the possible decomposition of organic materials), probably guarantees it does not harm the person (usually children) taking it.

The use of animals as medicine could be related to the facilities of (after the animal is killed) keeping at home its useful parts during long periods. Fat, cited as the most used part of several animals, is easily extracted and conserved at daily temperatures. All other animal parts, except eggs and milk, are processed through dehydration/sterilization (toasted), ground and can be conserved as powder until administration. This means that when some *caiçara* get sick, they do not have to leave their house to hunt medicinal animals; they already have at home animal-based medicines for use whenever it is necessary.

Recently, diversity indices have been used in studies on plant utilization, as a measure of folk knowledge, at several Atlantic forest communities (Figuereido et al. 1993, 1997; Hanazaki et al. 1996; Rossato 1996; Begossi 1996). Because *caiçaras* from Provetá have more medical assistance and are closer to Angra dos Reis (geographically, and also because they have much more boats to access the city) than people from Aventureiro, one could expect that Provetá people may lose their knowledge of native animals used as medicine. However, this expectation was not verified in our study. Although we have interviewed three times more people

TABLE 9.— Medicinal animals cited during interviews: From 29 people interviewed at Aventureiro, 4 men and 3 women knew no medicinal animal; and from 100 interviewees from Proveta , 13 men and 23 women knew none.

MEDICINAL ANIMALS Folk and English Names	Scientific Names	Percentage of Citations Aventureiro	Provetá	Diseases	Utilization
Abelha Bees	Hymenoptera	3		cough	Drink orange leaf tea with **honey**
Besourinho do Mar Ray egg	?		1	bronchitis	Toasted, ground and drunk as tea
Caramujo Snail	Molluscs	3		bronchitis	?
Capivara Capybara	*Hydrochaeris hydrochaeris*		3	rheumatism liver pain bronchitis	The **fat** is applied on the affected area. ? The **skin** is toasted, ground and drunk as tea.
Cavalinho do Mar* Sea horse	*Hyppocamus reidi*	7	9	bronchitis	Toasted or sun dried, ground and drunk as tea or eaten with meals by children
Corvina tea. Croaker	*Micropogonias furnieri*		2	bronchitis	The **otolith** is toasted, ground and drunk as
Égua Female horse	*Equus caballus*	3		cough	Drink the **milk**
Galinha caipira Chicken	*Gallus domesticus*	55	21	bronchitis and other respiratory diseases rheumatism skin thorns and wounds earaches cough	The **fat** is drunk with water or massaged on chest The **fat** is applied on the affected area. The **fat** is applied on the affected area. The **fat** is put inside the ear. The yolk of an **egg** is eaten with cooked orange leaves.
Gambá Opossum	*Didelphis marsupialis*	31	6	rheumatism skin thorns and wounds earaches bronchitis	The **fat** is applied on the affected area. The **fat** is applied on the affected area. The **fat** is put inside the ear. The **fat** is drunk with water or massaged on chest

TABLE 9 (continued).

MEDICINAL ANIMALS Folk and English Names	Scientific Names	Percentage of Citations Aventureiro	Provetá	Diseases	Utilization
Guaiamu*	*Cardisoma guanhumi* (?)	3	1	bronchitis	The **nails** are toasted and eaten.
Lagarto Lizard	*Tupinambis merianae*	51	37	skin thorns and wounds	The **fat** is applied on the affected area.
				rheumatism	The **fat** is applied on the affected area.
				respiratory diseases	The **fat** is drunk with water or massaged on chest or on the nose
				sore throat	The **fat** is massaged on the throat
				snake bites	The **fat** is drunk with warm water
Lula* Squid	*Loligo sp.*		8	bronchitis	The ***pena***[1] is toasted, ground and drink as tea.
Macaco Howler monkey	*Alouatta fuscus*	3		any disease	The ***pedra-da-goela***[2] is toasted and eaten.
Marimbondo Hornet	Hymenoptera		1	bronchitis	Its **house** is cooked in water. The water is filtered and drunk by children.
Ouriço* Porcupine	*Coendou sp.*	3		bronchitis	Seven **stings** are toasted and drunk with coffee.
Paca Paca	*Agouti paca*		1	wound in the breast caused by suckling	The **fat** is melted and applied on the breast.
Peixe Porco = Capucho* File fish	*Balistes capriscus*	3	11	bronchitis	The **skin** is toasted or sun dried, ground and drunk as tea or eaten with meals by children.
Peixe-boi Manatee	*Trichechus manatus*	3	3	rheumatism	The **fat** is applied on the affected area.
				skin thorns	The **fat** is applied on the affected area.
				bronchitis	?
Porco Pig	*Sus scrofa*		1	skin thorns	The **bacon** is fastened on skin thorns
Porco-do-Mato Collared peccary	*Tayassu tajacu*		1	bronchitis	?
Rã* Frog	Leptodactylidae	3	1	bronchitis and other respiratory diseases	The **skin** is toasted, ground and drunk as tea or eaten with meals

TABLE 9 (continued).

MEDICINAL ANIMALS Folk and English Names	Scientific Names	Percentage of Citations Aventureiro	Provetá	Diseases	Utilization
Tartaruga* Turtle	Cheloniidae	14	8	bronchitis	The **heart** or **liver** is toasted or sun dried, ground, and drunk with water or eaten with meals
				rheumatism	The **fat** is applied on the affected area.
				skin thorns	The **fat** is applied on the affected area.
Qualquer peixe Any fish	?		1	pain caused by skin fish-thorns	Any part of the fish should be put on the affected area to release the pain
Qualquer animal Any animal	?		1	women after childbirth who got sick after eating any *carregado* fish or animal	The spine or any bone is toasted, ground and drunk as tea.

* Beliefs (*Simpatias*): People should eat or drink it without knowing what they are taking.

[1]*Pena* is the thin flat cartilaginous structure inside squid body which strengthened its soft body

[2]*Pedra da goela* is the hyoid of the *Alouatta fusca* (Howler monkey)

at Provetá compared to Aventureiro, the richness of medicinal animals cited (17 animals at Provetá and 14 at Aventureiro) and the diversity of citation of these animals (Table 10) were not significantly different between the two communities. This fact could be explained as these two communities are located on the same island, exploit the same animal resources, and their inhabitants are associated in similar fishing activities (the sardine fishery) or related through marriages.

TABLE 10.— Diversity indices (Richness and Shannon-Wiener (H′)) based on citations of medicinal animals (folk names) during interviews.

Communities	Interviewees	Citations	Richness	Shannon-Wiener*
Aventureiro	29	57	14	2,84**
Provetá	100	112	17	3,188**

*Formula used:

H'= - S pi log pi (base 2)

where: pi = interviews' number in which an *i* animal was cited divided by the total number of quotations.

**The diversity comparision between both communities, following Magurran (1988), was not significant ($p>0.05$)

CONCLUSIONS

Throughout this paper, we presented data that supports Clement's arguments (1995) on the studies of folk classification of animals and plants: both cognitive and utilitarian factors are "aspects of the same process but on two separate levels." In some sense, we could also extend this argument to fish and game preferences and taboos, where we found both utilitarian and symbolist explanations. Rather than supporting an utilitarian/materialist or a structuralist/symbolist view, our study shows an inter-face between both points of view, which presents satisfactory explanations both for fish ethnotaxonomy as well as fish and game preferences and taboos.

Concerning the use of local knowledge in designing resource management plans, this study calls attention to the importance of a detailed investigation of local knowledge in order to avoid bias in interpreting and using of such data. Local knowledge about fish biodiversity seems an important source of information to elaborate appropriate fishery management strategies for areas adjacent to Aventureiro and Provetá, particularly for the Marine Park of Aventureiro. As well, local knowledge on the usefulness of fish and game as presented in this paper may provide for the elaboration of new regulations which should be more in tune with the local population needs, thereby increasing compliance in management. For example, despite the fact that hunting is prohibited inside the RBEPS and fishing is prohibited inside the Marine Park, compliance to the current regulation is not likely to occur voluntarily as some game and fish species are important sources for local medicine practices.

Understanding the reasons behind food preferences and taboos, the use of

animals in local medicine, and the diversity of fishing resources and their classification can provide helpful information for resource managers to elaborate more ecologically sound, and socio-economically appropriate management plans.

NOTES

[1] The term "scientific names" in this paper corresponds to the names given to animals and plants according to Linnean taxonomy.

[2] There are conceptual differences regarding the use of the term "taboo." Some authors argue that taboo should only be used when religious reasons appear behind the avoidance of an item or action. Taboos associated with hot-cold syndromes might be related to Hipocratic humoral medicine. Voeks (1995) found hot-cold syndromes in the Brazilian *candomblé*; the author observed that this ancient concept is present in European and Asian health and healing theories, but it is also present in Mesoamerica's pre- Hispanich civilizations. Hot-cold syndromes are also found among Brazilian rural populations (such as the *caiçaras* of the Atlantic Forest) in referring to a *reimoso* or tabooed food (considered as hot). In this paper, we use the term taboo to refer to any avoidance of an item or action, independent of the reason behind such avoidance. This approach has been previously used by other researchers, such as Ross (1978) and Begossi (1998).

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Appendix I: Fish identification of folk genera and species cited during interviews in Ilha Grande; correspondence between *caiçaras* folk names and scientific names.

Folk Names	Family	FISHES Genera-Species	Other Folk Names
One-to-one correspondence – folk genera			
Gigante	Belonidae	*Tylosurus acus**	
Olhete	Carangidae	*Seriola lalandi*	
Olho-de-Boi[1]	Carangidae	*Seriola dumerili**	
Olhudo	Carangidae	*Caranx lalus*	
Palumbeta	Carangidae	*Chloroscombrus chrysurus*	
Sarabiguara	Carangidae	*Trachinotus falcatus*	
Dourado	Coryphaenidae	*Coryphaena hippurus*	
Pregador	Echeneidae	*Echeneis naucrates*	
Barana	Elopidae	*Elops saurus**	
Roncador	Haemulidae	*Conodon nobilis**	
Salema	Haemulidae	*Anisotremus virginicus**	
Mangorra	Holocentridae	*Holocentrus ascensionis**	
Tainha	Mugilidae	*Mugil platanus*	
Piaba	Pempherididae	*Pempheris schomburgki*	
Frade	Pomacanthidae	*Pomacanthus paru*	
Tiniúna	Pomacentridae	*Abudefduf saxatilis**	
Enchova	Pomatomidae	*Pomatomus saltatrix*	
Bijupirá	Rachycentridae	*Rachycentron canadus*	
Castanha	Sciaenidae	*Umbrina canosai*	
Corvina	Sciaenidae	*Micropogonias furnieri*	
Maria-Luisa[1]	Sciaenidae	*Paralonchurus brasiliensis*	
Xingó	Sciaenidae	*Stellifer rastrifer* ***	
Cavala	Scombridae **	*Scomberomorus cavalla* **	
Cavalinha	Scombridae **	*Scomber japonicus* **	
Sororoca	Scombridae **	*Scomberomorus brasiliensis* **	
Mero	Serranidae	*Epinephelus itajara*	
Mira	Serranidae	*Mycteroperca acutirostris*	
Marimbá	Sparidae	*Diplodus argenteus**	
Pargo	Sparidae	*Pagrus pagrus*	
Espada	Trichiuridae **	*Trichiurus lepturus* **	***Peixe-espada***[2]
Cabrinha	Triglidae	*Prionotus punctatus**	
Over-differentiation type I – Folk genera/ species			
Case 1			
Carapau[3]	Carangidae	*Caranx crysos**	***Manequinho, Xerelete***
Manequinho[3]	Carangidae	*Caranx crysos**	***Carapau***
Xerelete[3]	Carangidae	*Caranx crysos* **	***Carapau***
Case 2			
Garabebê	Carangidae	*Trachinotus goodei**	***Pampo-Branco***
Pampo-Branco	Carangidae	*Trachinotus goodei**	***Garabebê***
Case 3			
Pampo	Carangidae	*Trachinotus carolinus**	
Pampo-Amarelo	?		***Pampo***

FISHES

Folk Names	Family	Genera-Species	Other Folk Names
Case 4			
Xaréu[5,6]	Carangidae	*Caranx hippos C. latus*	***Xaréu-Branco***
Xaréu-Branco[6]	Carangidae	*Alectis ciliaris*	***Xaréu***
Case 5			
Gudião-Sabonete[1]	Mullidae	*Pseudupeneus maculatus**	***Sabonete***
Sabonete	Mullidae	*Pseudupeneus maculatus**	***Gudião-Sabonete***
Case 6			
Savelha	Clupeidae	*Harengula clupeola* **	
Sardinha-Cascuda	Clupeidae	*Harengula clupeola**	
Case 7			
Capucho	?		***Peixe-porco***[2]
Peixe-Porco[2]	Balistidae	*Balistes capricus*	***Capucho***
Over-differentiation type II – folk genera			
Case 1			
Camburu	Muraenidae	Several species from *Gymnothorax* genus	***Moréia***
Moréia	Muraenidae	Several species from *Gymnothorax* genus	***Camburu***
Case 2			
Imbetara	Sciaenidae	*Menticirrhus americanus*	***Papa-terra*** or ***Perna-de-moça***
		M. littoralis	
Papa-terra[1]	Scianidae	*Menticirrhus americanus* *M. littoralis*	***Imbetara,*** ***Perna-de-moça***
Perna-de-Moça[1]	?		***Imbetara, Papa-terra***
Case 3			
Jaguareçá[4]	Holocentridae	*Holocentrus ascensionis*	***Sambalo, Olho de Cão, Jingolê***
Jingolê[4]	Priacanthidae	*Priacanthus arenatus* *P. cruentatus*	***Olho de Cão, Jaguareçá, Padecedo, Sambalo***
Olho-de-Cão[1,4]	Priacanthidae	*Priacanthus arenatus* *P. cruentatus*	***Jingolê, Jaguareçá, Sambalo***
Padecedo	?		***Jingolê***
Sambalo	?		***Olho-de-cão, Jaguareçá, Jingolê***
Case 4			
Parati-barbudo[1]	Polynemidae	*Polydactylus oligodon** *P. virginicus*	***Barbudo***
Barbudo	?		***Parati-barbudo***
Under-differentiation type I – folk genera			
Galo	Carangidae	*Selene setapinnis** *S. vomer*	***Peixe-Galo***[2]
Goivira	Carangidae **	Several species from *Oligoplites* genus	
Robalo	Centropomidae	Species from *Centropomus* genus	

Appendix I (continued)

Folk Names	Family	FISHES Genera-Species	Other Folk Names
Pirajica	Kyphosidae	*Kyphosus incisor**	
		K. sectatrix	
Caranha	Lutjanidae	More than one species from	
	Lutjanus genus		
Parati	Mugilidae	Several species from *Mugil*	
		genus, excepting *M. platanus*	
Namorado	Mugiloididae	*Pseudopercis numida*	
		P. semifasciata	
Atum	Scombridae	Species from *Thunnus* genus	
Badejo	Serranidae	Several species from	
		Mycteroperca genus	
Garoupa	Serranidae	Several species from	
		Epinephelus genus	
Michole	Serranidae	*Diplectrum formosum*	
		D. radiale	
Bicuda	Sphyraenidae	Several species from	
		Sphyraena genus	
Baiacu	Tetraodontidae	Several species from	
		Sphoeroides genus	
Under-differentiation type II – folk genera			
Arraia	10 families		
Cação	13 families		
Bagre	Ariidae	Several species	
Xixarro	Carangidae	More than one genus	
		(e.g., *Selar crumenophthalmus**)	
Sardinha	Clupeidae	Several species	
Baiacu-de-espinho[1]	Diodontidae	Several species	
Panaguaiú	Hemiramphidae	Several species	
Peixe-Agulha[2]	Hemiramphidae	Species from *Hemiramphus*	
		and *Hyporhamphus* genera	***Agulha***
Voador	Exocoetidae	Several genera	
		(e.g.,*Cypselurus melanurus**)	
Carapicu	Gerreidae	Name given to several species	
		(e.g., *Eucinostomus melanopterus**)	
Caratinga	Gerreidae	Name given to several species	
		(e.g., *Diapterus olisthostomus**)	
Emborê	Gobiidae	More than one genus	
Corcoroca	Haemulidae	More than one genus	
Sargo	Haemulidae	*Anisotremus surinamensis**	
	Sparidae	*Archosargus probatocephalus*	
		A. rhomboidalis	
Emborê-Castigo[1]	Labrisomidae	More than one genus	
		(e.g., *Labrisomus nuchipinnis**)	
Gudião	Labridae	Several species from more than	
	Scaridae	one genus from both families	
Vermelho	Lutjanidae	Several species from *Lutjanus* genus	
		Rhomboplites aurorubens	

FISHES

Folk Names	Family	Genera-Species	Other Folk Names
Trilha	Mullidae	*Mullus argentinae* *Upeneus parvus* **	
Linguado	Families of Pleuronectiforms	Species from more than one family	
Canguá	Sciaenidae	More than one genus	
Goete	Sciaenidae	More than one genus (e.g., *Cynoscion jamaicensis**)	
Maria-Mole[1]	Sciaenidae	Several species	
Pescada	Sciaenidae	More than one genus	
Bonito	Scombridae	More than one genus	
Serrinha	Scombridae	Several species	
Mamangaba	Scorpaenidae **	Several species	
One-to-correspondence – folk species			
Galo-da- Correição	Carangidae	*Selene setapinnis*	
Galo-Testudo	Carangidae	*Selene vomer*	
Xaréu-Preto[5]	Carangidae	*Caranx lugubris*	
Cação-Verdadeiro	Carcharhinidae	*Rhizoprionodon lalandei**	
Sardinha-do-Reino	Clupeidae	*Sardinella brasiliensis*	
Corcoroca-Bicuda	Haemulidae	*Haemulon plumieri**	
Corcoroca-Languicha	Haemulidae	*Haemulon aurolienatum**	
Gudião-Prego-de-Cobre	Labridae	*Halichoeres radiatus**	
Pescada-Branca	Sciaenidae	*Cynoscion leiarchus*	
Garopinha-São-Tomé	Serranidae	*Epinephelus morio*	
Over-differentiation – folk species			
Case 1			
Sardinha-Laje	Clupeidae	*Opisthonema oglinum* **	
Sardinha-Maromba	Clupeidae	*Opisthonema oglinum* **	
Case 2			
Corcoroca-Branca	Haemulidae	*Haemulon steindachneri* *Orthopristis ruber**	
Corcoroca-Sargo	Haemulidae	*Boridia grossidens* *Haemulon steindachneri* **	
Under-differentiation – folk species			
Cação-Anjo	Squatinidae	Species of *Squatina* genus	
Cação-Martelo	Sphyrnidae	Several species from *Sphyrna* genus	
Corcoroca-Branca	Haemulidae	*Haemulon steindachneri* *Orthopristis ruber**	
Corcoroca-Sargo	Haemulidae	*Boridia grossidens* *Haemulon steindachneri* **	

Folk Names	Family	FISHES Genera-Species	Other Folk Names
Folk genera not identified			
Cambebe	?		
Galhado	?		
Manjica	?		
Peixe-Cobra[v]	?		
Folk species not identified			
Bonito-Cadelão	?		
Cavalinha-do-Norte		?	
Gudião-Canivete	?		
Gudião-de-Ferrão	?		
Gudião-Vermelho	?		
Special case			
Languicha[7]	Haemulidae	*Haemulon aurolineatum**	*Corcoroca-Languicha*

Scientific names were first obtained from Figueiredo (1977), Figueiredo and Menezes (1978a, 1978b), and Menezes and Figueiredo (1980, 1985) including species collected and identified in this study (*), and secondly from other literature: (**) from Begossi and Figueiredo (1995) and (***) from Godoy (1987).

NOTES:

[1]Although binomials, these fish names were considered folk genera because they do not represent a variation of its against-part (e.g., ***Baiacu-de-espinho*** and ***Baiacu*** are from different families), or because they are simply complex names (e.g., ***Maria-Luiza***).

[2]*Peixe* means fish, so these are also complex names instead of real binomials; so, we also considered them as folk genus.

[3]As fishermen declared, we considered ***Manequinho***, ***Carapau*** and ***Xerelete*** as the same species: *Caranx crysos*. Thus, we did not consider *Decapterus punctatus* as ***Carapau*** (Begossi and Figueiredo 1995) but as ***Xixarro***, nor *Caranx latus* as ***Xerelete*** (Menezes and Figueiredo 1980) but as ***Olhudo***.

[4]Although ***Jaguareça*** is described in the literature as a member of the Holocentridae family (*Holoncentrus ascensionis*), we considered it as fishermen do - as the same as ***Olho-de-Cão*** and ***Jingolê*** (*Priacanthus* genus), a member of Priacanthidae family - for the reason that *Holocentrus ascensionis* were collected and identified as ***Mangorra*** - another folk name.

[5]According to fishermen, there are two types of ***Xaréu***: ***Xaréu-Preto*** and ***Xaréu-Branco***. ***Xaréu-Preto*** is cited in Menezes and Figueiredo (1980) as *Caranx lugubris* - a very rare species along the southeast Brazilian coast. However, it was many times cited during interviews.

[6]Some fishermen say ***Xaréu*** is the same as ***Xaréu-Branco***. ***Xaréu-Branco*** appears in literature as *Alectis cilliaris* (Menezes and Figueiredo 1980) and ***Xaréu*** as *Caranx hippos* (Menezes and Figueiredo 1980) and *Caranx latus* (Begossi and Figueiredo 1995). Nevertheless, *Alectis cilliaris* is quite morphologically distinct from *Caranx* species. Since *Caranx latus* were collected and identified as ***Olhudo***, we considered, as fishermen do, ***Xaréu*** and ***Xaréu-Branco*** as being the same species: *Caranx hippos*.

[7]Even ***Languicha*** is monomial written we considered it as a folk species because it is a simplification of binomial name ***Corcoroca-languicha***. One may argue that it is also the case of ***Barbudo*** and ***Parati-barbudo*** or ***Sabonete*** and ***Gudião-Sabonete***. In the former case, however, the ***Corcoroca-languicha*** is part of the scientific family (Haemulidae) which include all fish named ***Corcoroca***. In the latter cases, ***Parati-barbudo*** (Polymenidae) and ***Gudião-sabonete*** (Mulidae) are not variations in the same family of its against part ***Parati*** (Mugilidae) and ***Gudião*** (Labridae and Scaridae).